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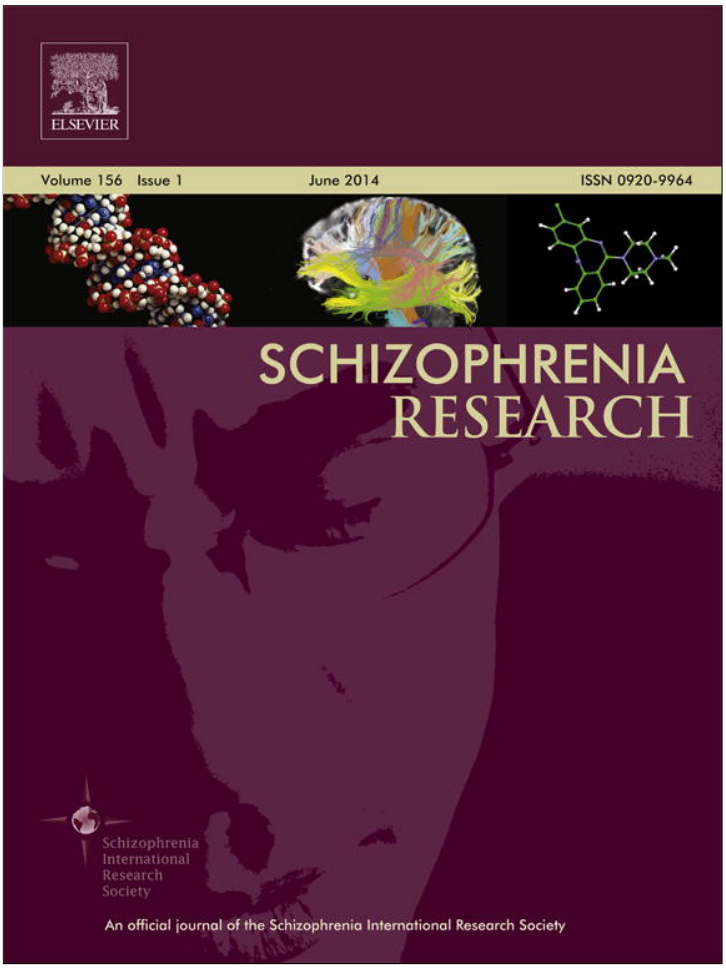

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Letter to the Editor

A comparison of decision making in patients with bipolar i disorder and schizophrenia

Currently there is a heated debate about whether bipolar disorder (BD) and schizophrenia (SZ) are separate diseases or if they are part of a neurodevelopmentally continuous model of psychosis (Cosgrove and Suppes, 2013). Both genetic and familial studies showed that there is an overlap in genetic risk of these disorders (Möller, 2003) and neurocognitive functioning is one of the most frequently investigated endophenotypes. Neurocognitive studies consistently reported quantitative rather than qualitative differences not supporting a nosological distinction (for a review see Stefanopoulou et al., 2009). A paradigm in which qualitative differences could be found is in decision-making tasks (Yechiam et al., 2005); in this paradigm patients with SZ have shown alterations while those with BD may have more preserved performance (Sevy et al., 2007; Samamé et al., 2012). Then, the aim of this preliminary subanalysis was to compare performance of stable outpatients with BD and SZ in a decision-making paradigm.

The present sample comprised 70 outpatients with BD type I ($n = 45$) and SZ ($n = 25$) according to DSM-IV using Structured Clinical Interview for DSM-IV and 40 healthy controls. Patients were included if they were between 18 and 60 years of age and if they were clinically stable (without changes either in medication or in psychiatric inpatient admission) during the last two months. Exclusion criteria were: antecedent history of substance use disorder, neurological disease, or any unstable clinical condition that could affect cognitive performance. Additionally, 40 healthy controls were included: these had no antecedence of neurological disease and history of either psychotic or affective disorders in themselves or a first-degree family member. The study was approved by Hospital Ethics Committee and all subjects gave written informed consent.

All subjects performed a neuropsychological battery selected to assess the following cognitive domains: 1) Attention: Forward Digit Span (Wechsler, 1955), and Trail Making Test part A (Reitan, 1958); 2) verbal memory: Memory Battery of Signoret (Signoret and Whiteley, 1979); 3) language: Boston Naming Test (Kaplan et al., 1983); and 4) executive functions: Wisconsin Card Sorting Test (Heaton, 1981), Trail Making Test part B (Reitan, 1958), Backward Digit Span (Wechsler, 1955), and Phonological Fluency (Benton et al., 1983). The Iowa Gambling Task (IGT) (Bechara et al., 1994) was used as a decision-making paradigm.

There were no differences between groups in age (SZ = 35.17 ± 12.03; BD = 37.04 ± 10.39; controls = 40.28 ± 12.03; $F = 1.85$; $df = 2$; $p = 0.16$), although patients with SZ had fewer years of education than patients with BD and controls (SZ = 10.29 ± 2.24; BD = 14.00 ±2.38; controls = 13.88 ± 2.77; $F = 20.01$; $df = 2$; $p < 0.001$). Both patient groups had similar mean age of onset (SZ = 23.54 ± 5.44; BD = 25.98 ± 9.07; $F = 1.44$; $df = 1$; $p = 0.23$) and length of illness (SZ = 11.00 ± 7.41; BD = 10.24 ± 7.04; $F = 0.17$; $df = 1$; $p = 0.68$). One-way multivariate analysis of variance was conducted, with all neurocognitive measures as dependent variables and group membership as factor. A significant overall difference in neurocognitive functioning between the groups was detected with multivariate analysis of variance (Pillai's $F = 4.88$; $df = 24, 192$; $p < 0.001$). The group mean performance for each neurocognitive measure and the respective analysis of variance are shown in Table 1. Results were not modified when the years of education were included as a covariate. Group differences in the chronological selection of advantageous versus disadvantageous decks in IGT were examined using repeated-measures ANOVA with group as a between-subject factor and time (five blocks of 20 trials) as a within-subject factor. There were significant main effects for time ($F = 41.58$, $p < 0.001$) and for group ($F = 3.21$, $p = 0.044$), while interaction effect did not reach significance ($F = 1.80$, $p = 0.17$). Post hoc analysis of repeated-measures ANOVA revealed that there were no differences between controls and BD ($p = 0.992$), while both groups tended to have superior performance than patients with SZ ($p = 0.040$ and 0.044 respectively).

These preliminary results confirm the findings of earlier studies that patients with BD have an intermediate performance between subjects with SZ and healthy controls in traditional neurocognitive domains. However, BD patients performed comparably to healthy controls on the IGT, whereas SZ patients had an impaired decision-making performance compared with both BD and comparison groups. This result represents a qualitative difference in neurocognitive functioning between BD and SZ. Another recent study using Expectancy–Valence model reported specific diagnosis differences in IGT, with SZ associated with disrupted associative learning and BD with increased incentive salience of gains (Brambilla et al., 2013). Together, these differences might contribute to explain the dissimilarities in clinical presentation and functional outcome seen in these disorders in everyday care practice.

Some limitations of our work need to be acknowledged. A larger sample size potentially could have demonstrated much clearer differences between patient groups in performance in IGT. Additionally, all patients have taken psychotropic medications and the effects of these medications cannot be excluded altogether from the interpretation of the findings. Beyond these limitations, this study provides additional evidence that the analysis of higher order functions more than traditional domains could help find qualitative differences in the neurocognitive profile of these disorders.

Contributors

DJM and SAS contributed to the design of the study and supervised the research project. DJM performed the data analysis and drafted the manuscript. Both authors contributed to and have approved the final manuscript.

Conflict of interest

The authors report no financial or personal relationships, interests, and affiliations relevant to the subject matter of the manuscript.

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Table 1
Neurocognitive evaluation of bipolar patients and healthy controls (values are expressed as mean, standard deviation is shown in brackets).

	Bipolar I (A) (n = 45)	Schizophrenia (B) (n = 25)	Controls (C) (n = 40)	MANOVA (df = 2)	Group comparison (p-value)		
					A v. B	B v. C	A v. C
Verbal memory							
Immediate Recall	7.08 (1.90)	5.17 (2.17)	8.50 (1.23)	F = 27.19**	<0.001	<0.001	<0.001
Delay recall	6.58 (2.04)	4.35 (2.16)	8.34 (1.48)	F = 33.77**	<0.001	<0.001	<0.001
Attention							
Forward Digit Span	5.69 (1.31)	5.38 (1.10)	6.38 (1.03)	F = 6.43*	0.539	0.004	0.022
Trail Making part A	40.62 (20.97)	57.58 (19.15)	31.72 (10.21)	F = 16.71**	0.001	<0.001	0.052
Language							
Boston Naming Test	50.82 (7.00)	47.29 (5.03)	52.73 (3.95)	F = 7.01*	0.038	0.001	0.269
Executive functions							
Phonological Fluency	14.91 (5.08)	12.63 (3.50)	19.00 (4.15)	F = 17.41**	0.108	<0 .001	<0.001
Trail Making part B	96.60 (43.22)	120.83 (48.85)	70.67 (18.66)	F = 13.75**	0.033	<0.001	0.006
WCST—perseverative errors	10.80 (8.36)	22.79 (12.92)	8.03 (5.05)	F = 23.28**	<0.001	<0.001	0.305
Iowa Gambling Task							
No. cards chosen from deck A	15.18 (5.85)	20.46 (7.06)	14.68 (6.24)	F = 7.30*	0.003	0.002	0.928
No. cards chosen from deck B	26.42 (9.89)	29.88 (11.55)	26.78 (12.24)	F = 0.82			
No. cards chosen from deck C	24.84 (11.96)	25.00 (13.00)	21.20 (13.04)	F = 1.16			
No. cards chosen from deck D	33.33 (10.54)	24.62 (9.71)	37.35 (12.62)	F = 7.01*	0.007	<0.001	0.228

* $p < 0.005$.
** $p < 0.001$.

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